Study opportunity: PhD project at the Coastal and Marine Research Institute, Nelson Mandela Metropolitan University

We invite applications for the below full-time study opportunities at the Coastal and Marine Research Institute, a rapidly developing and dynamic centre of excellence in marine zoological and environmental research, encompassing fields from oceanography to top predator ecology and ecosystem modelling.

**Project title:** African penguin phenotypic plasticity during global changes

**Supervisor:** Dr Lorien Pichegru

**PROJECT OUTLINE**

Climate change profoundly modifies marine ecosystems and the services it provides to humanity in terms of natural resources and jobs. Ecosystem responses to climate change are largely dependent on phenotypic plasticity, the ability to change phenotypes as the environment changes, within the constituent species. Top predators are essential for ecosystem functioning but of conservation concern in the marine environment. For example, numbers of African Penguin *Spheniscus demersus* decreased by 70% in South Africa for the past 10 years. Mitigating global change effects requires an understanding of ecosystem functioning, particularly predator-prey interactions and trophic level responses to variability in the environment. The proposed project will take advantage of an existing long-term monitoring program in Algoa Bay, South Africa. Using a holistic and multi-disciplinary approach, we will explore the evolutionary ecology of individual-level plasticity in African penguins, i.e. how individual variability may influence population dynamic, and how evolutive constraints may limit the range of responses. The project aims to (1) explore individual flexibility during years of contrasting environmental conditions by relating behavioural responses recorded from state-of-the-art bio-loggers to physical (SST, Chla, water stratification) and biological (prey distribution and abundance) environmental conditions; (2) relate individual flexibility to individual characteristics, such as personality, stress levels, sex and body condition; and (2) relate such individual characteristics to fitness, i.e. breeding success (chick growth, fledging rate) and survival (return rates to the colony). A modelling approach will be used to explore how individual characteristics and plasticity in behavioural responses to environmental conditions may influence population trajectories in a rapidly changing environment. The results will provide valuable information and recommendations for models for the developing Ecosystem Approach to Fisheries (EAF) for the purse-seine fishing industry in South Africa and for climate change-integrated conservation strategies for South African marine ecosystems.

For additional information, please contact Dr Lorien Pichegru (lorien.pichegru@nmmu.ac.za)

**APPLICATIONS AND FUNDING**

Applicants should have an MSc in Zoology with excellent records and some field experience with seabirds, or equivalent experience. They will form part of an existing dynamic research team, but will also be required to organize and conduct field work independently on isolated islands, often under trying conditions and with minimal comfort. The successful applicant will be awarded a PhD bursary of R120 000 per year and may apply for an additional NMMU Postgraduate Research Bursary.
To apply, please send a CV (including academic records & names and contact details of three referees) and a short motivation for why you wish to undertake this research to Dr Lorien Pichegru (lorien.pichegru@nmmu.ac.za).

**Closing date:** 31st November 2015